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ABSTRACT

English tenses are discussed in terms of a unique ordering of three moments of time: the moment of speech, the moment of the event and the reference point. The aims of the paper are to: (1) show the usefulness of introducing the concept of reference point in tense analysis, (2) provide an account of how to construe reference points semantically, and (3) speculate on how to fit this semantics of tenses into a formal grammar of English. Reference point is defined as an expression which refers to a moment of time at which it is appropriate to utter some temporally-positioned version of the sentence in question, and as an expression that designates a time at which the speaker of the sentence might imagine himself as uttering some version of the sentence in question. This definition has to do with speaker strategies, aims of discourse, and beliefs of the speaker. In this analysis, tenses are viewed as properties of entire sentences rather than as properties of verbs or verb phrases. A semantic approach is proposed, since tenses are not always marked morphologically or syntactically. Representations of all relevant tenses and sequence of tense rules can be generated by the proposed analysis. (CLK)

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A Proposal for the Semantics of Tenses in English*

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It is possible to produce a simple and adequate theory of English tense constructions if each tense is taken to depend on a unique ordering of three moments of time: the moment of speech, the moment of the event (occurrence of the event) or state of affairs, and the reference point. The first two of these -- the moment of speech and event -- should occasion no surprise; tense logic and informal discussions of tenses by linguists and philosophers alike assume the need for talking about the time of speech and the time of the event in any semantics of tenses. It is the third -- the reference point -- which is unusual. Mention of a reference point in the analysis of all tenses is unique to the work of Reichenbach in his Elements of Symbolic Logic.

I shall discuss the usefulness of introducing reference points in an analysis of tenses, and then try to provide some kind of an account of how to construe reference points in a semantics. I'll conclude by speculating briefly on the way to put my semantics of tenses into a formal grammar.

1.1 There are several tenses for which something like a "reference point" is necessary, particularly the past perfect and future perfect.

- (1) Mort had dropped the potato when Zeke came in.
- (2) Nixon will have resigned by next month.

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In a relatively informal way, it is obvious how to reconstruct these sentences. (1) comes out: at some moment of time t' (when Zeke came in), preceding the moment of speech t , 'Mort dropped the potato' is true. And (2) becomes: at some moment of time t' (by next month), after the moment of speech t , 'Nixon resigned' is true. Most speakers of English need to have some sort of time adverbial, temporal designator, or independently (contextually) given specification of the reference point in order to interpret sentences like (1) and (2) without some puzzlement.¹ This specification of the reference point may be brought about deictically (as it is in (2)), or through dates or descriptions; the means are unimportant for the purposes of my argument. What is important is that a moment of time be specified at which -- in the cases of (1) and (2) -- it would be appropriate to utter a simple past-tense counterpart -- with appropriately shifted time adverbials -- of

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those sentences which were originally marked as past perfect and future perfect. I shall specify in more detail later what "appropriateness of utterance" amounts to, for it plays an essential role in my account of reference points. But it is apparent from my brief informal reconstructions of (1) and (2) that the truth of a sentence at a time might be an element of "appropriateness".

1.2 The need for reference points is obvious with the past perfect and future perfect. It is not very obvious that it is needed in analyzing other tenses, but there are good arguments for using it with all. To begin with, by introducing a reference point in the analysis of each tense, it is possible to generate uniquely all the relevant tenses. Thus, following Reichenbach (Reichenbach, 297), and using 'R', 'E', and 'S' as designators of moments of time representing the reference point, time of the event, and moment of speech respectively; and using '/' to indicate a temporal interval and ',' temporal coincidence, we get:

	<u>Reichenbach's Name</u>	<u>Traditional Name</u>
E/R/S	Anterior Past	Past Perfect
E, R/S	Simple Past	Simple Past
R/E/S		--
R/S, E	Posterior Past	
R/S/E		--
E/S, R	Anterior Present	Present Perfect
S, R, E	Simple Present	Simple Present
S, R/E	Posterior Present	Simple Future
S/E/R		--
S, E/R	Anterior Future	Future Perfect
E/S/R		--
S/R, E	Simple Future	Simple Future
S/R/E	Posterior Future	--

Reichenbach's names for tenses are generated by using 'anterior', 'simple', and 'posterior' for the position of E with respect to R, and 'past', 'present', and 'future' for the position of R with respect to S. The display of 'E', 'R', 'S', ',', and '/' which uniquely specifies each tense is to be read as giving clues to the semantics of the tenses of clauses or sentences; that is, tenses are "properties" of sentences, rather than verbs or verb phrases. The classification is, moreover, semantic, and corresponding syntactic or morphologically realized markings do not in all cases exist in English. So, for instance, the standard English future is marked with the modal 'will', but Reichenbach's distinction between the posterior present (mirror image of the present perfect) and the simple future (mirroring the simple past) is not reflected in morphology or syntax. On the other hand, Reichenbach's classification makes tenses out of constructions which are marked, but not normally recognized as tenses. Hence, 'would' marks the posterior

past ('John didn't realize that Dick would erase the tape'), although there is no "would" tense in standard grammars or logics. Progressive versions of all the above tenses can be represented by having 'E' span an appropriate interval of time. Gnomic tense constructions ('John walks to work') are not represented; the semantics of gnomic tense constructions is different (compare: 'Sabre-toothed tigers were vicious', 'Wolverines are vicious'), and I am not trying to account for them here. I shall, moreover, ignore "tenseless" constructions ('2 plus 2 is equal to 4').

One apparent advantage to representing tenses with E, S, and R is, then, that from rather limited machinery we can "generate" representations of all the relevant tenses, gaining thereby at least a certain kind of descriptive adequacy. All and only the non-trivial combinations of 'S', 'E', 'R', ',', and '/' correlate with the recognized tenses, and predict a straightforward semantics for otherwise unrecognized tense constructions like Reichenbach's posterior past.

1.3 The SER account seems to permit an easily-formulated sequence of tenses rule.

- (3) He didn't expect George would be here.
- (4) *He didn't expect George will be here.
- (5) Harry believed that his crocodile had migraines.
- (6) *Dick believed that he is king.
- (7) By 1960, Dick had decided that he would have to become a rich lawyer.
- (8) *By 1960, Dick had decided that he is the choice of the people.

The stars are explained if they break a rule like this: In complementizing constructions in which a matrix clause is in the simple past tense, the embedded clause(s) must have the same reference point as the matrix. In (3-8), the reference points of the matrix clauses all precede the moment of speech, and because (4), (6), and (8) have embedded-clause reference points at times different from the matrix clauses, they are ruled out.

It might be possible to support a more general rule, perhaps something like this: Reference points must be the same in (a) connected discourse involving a number of sentences, (b) coordinate constructions, except those involving either direct or indirect reference to sequence in time, and (c) embedding constructions like those above, where the embedding verb's clause is in the simple past or anterior past tense. There are many problems with this "rule". It is not obvious what is meant by 'connected discourse' in (a), for instance, though perhaps maintenance of a reference point common to several sentences could be used in defining 'connected'(in story-telling, for instance). Nor is it clear how the rule works with several kinds of coordinate constructions, particularly idiomatic ones ('Either you got rid of him, or you'll be up a

'creek'). And finally, there are a whole class of exceptions to (c), outlined by Rachel Costa in CLS 8. But all these difficulties are instructive, particularly the last; for all of them help clarify what is involved in "keeping the same reference point", and help clarify in turn what a "reference point" is.

One way of summarizing Costa's results is to say that under certain circumstances, shifting the reference point of an embedded clause under a simple past-tense or anterior past matrix clause from one coincidental with the matrix to one coincidental with the moment of speech is permitted; and in fact given various assumptions about the beliefs of the speaker, and his beliefs about his audience's beliefs, and his views about the relevance of the information contained in the embedded clause to current (speech-time) circumstances, it is required. The factivity (cf. Kiparsky and Kiparsky) of the matrix verb plays an important role in this shift. Note that though (6) 'Dick believed that he is king' is out, 'Dick regretted that he is king' is perfectly good, assuming that the speaker agrees that Dick is king. Similarly, 'Harry regretted that George is lonely', and (for some speakers) 'By 1960, George had discovered that Sylvia is unmarried' go through. With more information about the speech-situation, shifting is required. Hence Costa's example, where in response to 'Did Sarah have any ideas about what might be wrong with my marriage?', an appropriate response would be, 'Well, she mentioned that married couples often {discover} {that they wrongly {think}} {that their sex-life is} {was}' perfect'. Yet the past-tensed version of this sentence is perfectly acceptable in other circumstances, where it is not a response to someone seeking advice.

As I said, it is possible to explain Costa's data with a reference-point shift. But with the SER account, a reference-point shift to the moment of speech should permit not just a simple present embedded clause, but an anterior present (present perfect) and posterior present (one version of the simple future) as well. And this turns out to be correct, so that, depending on the relationship of E to R, an anterior present, simple present, or posterior present is appropriate, given something like "current relevance".

George	{regretted}	that Harry	{is leaving}			
	{realized}		{will be leaving}		right now	}
	{knew}		{has left just now}			
George	{*wished}	that Harry	{is leaving}			
	{?hoped}		{will be leaving}		right now	}
	{*thought}		{has left just now}			

The facts, which presumably depend upon the difference between factive and non-factive matrix verbs, are unfortunately rather soft. But I don't find that particularly bothersome. For I suspect that it is

current relevance which is the important factor in shifting of this sort, rather than the factivity of the matrix verb. A verb's factivity helps explain one aspect of current relevance. The truth (or belief by the speaker in the truth) at the moment of speech of an S,R version of the embedded sentence is perhaps a partial condition of its "relevance". But it is not a necessary nor a sufficient condition for current relevance. Moreover, non-factives permit any of the three S,R tenses, given current relevance.

George [the father who is dead]. hoped that you will now be happy [to the daughter and new husband].

Harry dreamed that Nixon is being impeached.

Dick hoped that he has won.

I have to grant that these non-factive cases are sometimes harder to get than their factive counterparts, but there are no really clear-cut cases. Perhaps verbs should be graded individually, but it is likely that, given interaction with contextual requirements, the grading would be (is) very complex.

It is more difficult to find clear-cut restraints on reference-point shifts from reference points after the moment of speech. The English 'will...' construction is not likely to give clear examples of future reference points, since on the SER account it is also the standard marking for the posterior present with its reference point at the moment of speech. But a "forced" future reference point is possible with temporal adverbs, and the future perfect should also give fairly clear-cut examples. For many of my informants, there is a difference between,

(9) By next term, George will (have) $\left\{ \begin{array}{l} \text{take(n) into account} \\ \text{forget (forgotten)} \\ \text{resent(ed)} \end{array} \right\}$ that there

$\left\{ \begin{array}{l} \text{were} \\ \text{are} \\ \text{will be} \end{array} \right\}$ bats in the attic.

(10) By next term, George will (have) $\left\{ \begin{array}{l} \text{assume(d)} \\ \text{conjecture(d)} \\ \text{figure(d)} \end{array} \right\}$ that there $\left\{ \begin{array}{l} \text{were} \\ \text{are} \\ \text{will be} \end{array} \right\}$ bats in the attic.

In particular, though in the factive cases, (9), the embedded tensed clause can have either an unshifted or a shifted reference point (where the bats are in the attic before, after, or simultaneous with the moment of speech or the time at which George resents, etc.), in the non-factive case with a 'will be' in the embedded clause, the bats must be in the attic after the reference point (when George assumes, conjectures, etc.). In both cases, however, 'were' or 'are' in the

embedded clauses will usually permit a shifted or an unshifted interpretation.² Now, the facts are too complex and foggy to permit anything but crude speculation on what is happening here, but perhaps some speculation is in order. Uses of future tenses generally involve predictions, planning, stating intentions, or volitions. In all of these uses, there is a considerable amount of speaker involvement. This would, I hypothesize, tend to keep the actual reference point of any sentence making a prediction, stating a plan, etc., with the speaker at the time of utterance. Note that when constructing counterfactual conditionals, one uses the anterior and posterior past and simple past, much more effective "distancing" machinery, for here one can presume speaker and hearer know what actually did happen and a contrast with the present situation makes sense. There are of course uses of conditionals which do not have the various pasts, but presents and futures:

- (11) If you take the A train and I take the D, I'll get to Harlem before you.
- (12) If you throw that chunk of sodium into that puddle, you'll be surprised.
- (13) If you take the Buick you'll get there faster -- if you can get the gas.

Uses of these sentences do not, however, produce "distancing", and are not supposed to; they're used to give advice, for whimsy, or other uses in which "current relevance" can be assumed. All of (11-13) make sense with various past tenses systematically substituted, but then they do not do the same job. The basic point seems at least fairly clear. Standard uses of the future will often have the reference point locked in with the moment of speech, and even when the reference point is clearly after the moment of speech, shifting is often easy.

1.4 Whether or not my hypothesis about the reason why future reference points are readily shifted is correct, it is obvious that future reference points are relatively unusual when compared with past. In fact, the future mirroring of the past perfect is only obliquely represented in English. Reichenbach (297) conjectures that a sentence like 'I shall be going to leave' might be construed as a posterior future, where my leaving after a certain point (R) is captured by talking about my future preparation for leaving. This is about as close as English comes to languages with future participles, e.g. Latin's 'arbiturus ero'.

1.5 The anterior present (the present perfect) is a particularly interesting tense, and the SER account of it has, I believe, several advantages not shared by others. The problem for any account of the semantics of the anterior present is that the simple past and the anterior present both share a certain amount of "semantic structure"

for in both, the time(s) of the event(s) precede(s) the time of speech, and yet they are clearly different semantically. A theory has to display the parallels, and yet explain the differences. A purely syntactic account of tenses like Chomsky's, based on surface structures, doesn't of course even try to capture the parallels or differences,³ but a semantic theory must.

McCawley (103-110) has a complex and useful analysis of the anterior present. McCawley derives the anterior present from a semantic representation involving a quantifier which operates over one propositional function giving a range to the quantifier (the temporal scope of E, to include S), and another propositional function which gives "...the property that is being asserted of things in that range." The restricted quantifier helps explain the differences between two different kinds of present perfect, the universal ('I've known Max since 1960') and the existential (I've read Principia Mathematica five times'). Different machinery is required to handle the stative ('I can't come to your party tonight -- I've caught the flu') and the "hot news" ('Malcolm X has just been assassinated') varieties. But all four are supposed to give a source for a past tense embedded in a present, thus explaining at least why short-range speech-centered deictic adverbials like 'now' are appropriate with anterior presents, though not with simple pasts:

*I read three books now

I have read three books now.

There are other kinds of present perfects which do not fit nicely into McCawley's classification, e.g., 'Hell, even my grandmother has climbed Mt. Olympia', but perhaps his theory could be modified to handle sentences like this.

Now, I do not deny that there are different, and fairly predictable, differences between various kinds of uses of the anterior present; I agree that McCawley's categories do capture clearly different uses. But I suspect that it is not necessary to account for these differences by introducing four kinds of anterior present. Some of these same semantic differences exist with various uses of other tenses, even the simple present. The universal/existential distinction, for example, probably corresponds to the active/stative distinction.⁴ It is possible to capture the distinctive semantics of the anterior present with much less machinery, and it is probable that the simpler machinery can handle more cases.

The use of the anterior present on an occasion by a speaker expresses the speaker's belief in the current relevance of some event(s), state(s), etc., which precedes the amount of speech. This generalization captures uses of the following sentences:

George has been there before; he can tell us about it.

Even my grandmother has climbed Mt. Olympia.

Harry here has passed all his examinations except for this one.

I've taken my sister to dances before [said in advice to friend by 14 year old George].

And I suspect that it would be difficult to capture these and a large number of other uses of the anterior present without relying upon something like "current relevance". That current relevance is important in an analysis of the present perfect is neither surprising nor new; but I am arguing that if we want a distinguishing mark for the present perfect, something like current relevance all alone will work (though of course it might be necessary to say what "current relevance" amounts to). Current relevance is a pragmatic notion, rather than a purely semantic one, so perhaps I can restate my point: Any adequate account of the present perfect is going to have to be a pragmatic one rather than semantic alone.

The SER theory of tenses is a pragmatic one, primarily because of its reliance on reference points. The difference between the simple past and the anterior present consists in the fact that in the first case R is coincidental with E, in the second with the time of speech. On the SER theory, this coincidence is a way of representing the effect of current relevance, though it does not by itself explain it.

1.6 The simple present is not "simple" on the SER theory; as with all the other tenses, a reference point is included in its analysis, but in this case it does not appear to be very well motivated. Perhaps all we need in an analysis of the simple present is the coincidence of S and E, which is, basically, the standard account of the present. But, I believe, the R is required as well.

Including 'R' in an analysis of the present tense helps to capture a generalization. Several writers have noticed that the anterior present is normally useful only when the speaker can presuppose the existence at the time of speech of the thing referred to by the subject of the sentence. This explains

*Aristotle has written an article, '55 spheres and you'

*Frege has given me a reference.

The facts, as I have already mentioned, are quite complex. Current relevance seems to be the important factor, and the presupposition of the existence of an item might be argued to be dependent on the more general notion of the speaker's attempt to express current relevance. Other problems lurk too, since presupposition in this case seems to be

speaker-dependent ('God has been good to us'), and context-dependent ('Methinks Hamlet has lost his cool'). But the generalization for the anterior present is fairly reliable. And it appears to be just as reliable for the simple present and the posterior present. This is not surprising for the posterior present, if my remarks concerning uses of the future are anywhere near the mark; and it is not surprising for the simple present. Reporting uses ('George is running a good race'), which are about the only uses which concern us here, generally require the subject NP to refer to some item in the speaker's world at the time the speaker utters the sentence. So generalization is possible. All tenses with reference points coincidental with the moment of speech normally require the existence at the time of speech of the item referred to by the subject NP.

There are some more interesting facts that the R,S cluster might help explain. These concern conversational strategies and in particular, initial sentences in a "connected" set (perhaps unary) of sentences making up a conversation. It has been noted that sentences like 'George killed the duckling', when uttered initially (at the start of a conversation) and independently of a special context, are odd. I said earlier that something that looks like this phenomenon is clearly present with sentences in the anterior past and anterior future, for 'John had seen Mary' and 'John will have seen Mary' are puzzling. They would normally require a specification of a reference point by means of temporal adverbials (adsententials?) or discourse context, as with 'John had seen Mary as of yesterday', 'John will have seen Mary tomorrow'. But even with a reference point specified in the sentence, the same kind of oddness exists as that which appears with the simple past, 'George killed the duckling'. All of these sentences are puzzling because it is difficult to imagine someone actually using them in an otherwise non-"loaded" context without in some way indicating why they are appropriate. So, in response to 'What's for dinner?' 'George killed the duckling' is fine, even if a bit oblique; and 'John had seen Mary as of yesterday, but I don't think that anyone else had-or has since' is felicitous in response to 'Are you sure Mary came back from her vacation?'. The same problems do not arise in any systematic way for initial utterances of sentences in the anterior, simple, and posterior present; for with these tenses, speaker and hearer normally presuppose and presume the same things. There is an available context, and there is no need to force one. A hearer may fail in uptake with an utterance like 'There are rats in the basement', 'Nixon will resign in a few hours', or 'The duck has eaten your grass seed', but it will not normally be because the speaker has presumed something he should not. With the other tenses, however, it is usually wise for the speaker to supply a special context,⁵ or at least be in a position to assume that his audience can supply one with little effort. Again -- though I have little confidence in this "argument" -- the set of R,S tenses turns out to be usefully unique in discourse-initial positions.

1.7 I have been trying to show that an SER account of tenses can be useful. It makes good predictions, permits the simple formulation of rules and generalizations, makes distinctions where they are necessary, and might even be helpful in stating some rules for conversational strategies. But the whole thing leaves one with the feeling of hocus-pocus; just what is a "reference point", and how does it function semantically? It is time to be a little more precise.

2.0 There are at least two ways of providing an SER account of tenses. On one, 'R' is an expression which refers to a moment of time at which it is appropriate (would be appropriate) to utter some temporally-positioned version of the sentence at hand. This analysis was behind my remarks on the posterior past and posterior future in section 1.1; it is in approximately the same ballpark as most semantic theory. The other account treats 'R' as designating a time at which the speaker of the sentence might imagine himself as uttering some version of the sentence at hand. This analysis treats tenses, not in terms of appropriateness of utterance semantically understood, but in terms of speaker strategies, aims of discourse, speaker beliefs and the like. The two analyses complement each other. I'll begin a discussion of the SER theory by explaining the outlines of the first analysis.

2.1 Each tense in Reichenbach's original account is represented by a combination of 'S', 'E', 'R', ',', and '/'. ',' and '/' are predicates which translate as, approximately, 'is simultaneous with' and 'precedes' respectively. 'S' and 'E' are referring expressions, designating moments (or intervals) of time; they abbreviate more complex expressions like the following: 'E': 'the moment at which the event e takes place', 'S': 'the moment of speech'. The moments in question, given a particular utterance on a certain occasion in a certain context by someone, will be fixed. The clues for the fixing are normally contextual, aided by temporal adverbs, discourse context, and the like. The fixing may be, and usually is, very imprecise.

Further analysis comes naturally. Assume that event-expressions ('e') are derived nominalizations, produced from sentences. If this is the case, we can read 'the moment at which the event e takes place' as 'the moment at which ' σ ' is realized', where ' σ ' is the sentence of which 'e' is the derived nominalization. The sentence ' σ ' is handy to have for the analysis of 'R', the reference point. ' σ ' should be tenseless (in the interests of semantic cleanliness), but to help things along, I'll insist that it be dated; its date corresponds to the date of the moment designated by 'E'. Now, with some contortions, one may do to 'S' what I did to 'E'. The contortions involved are complex, but not unusual in providing a semantics of this type. Probably the sentence to take the place of ' σ ' in the translation of 'E' above would have to be "performative" in a sense now familiar because of the work of Ross and others. I am not now concerned with these details, but

shall assume that it is possible to fix referents for 'E' and 'S' by talking about the time at which events occur, or the times at which sentences are realized.

Most analyses of the semantics of tense now consider the preliminary work to be done; something like 'S' and 'E' are assumed to be adequate. And these analyses are well motivated, at least in the sense that it is clear that from the resources now at our disposal, used in defining 'S' and 'E', 'R' is not definable. But -- I have argued -- reference points are essential to an analysis of tenses in ordinary English.

The crux of the problem is that 'R' is not an abbreviation for some expression which will fix a moment of time for us in the relatively straightforward ways that 'S' and 'E' will. According to the naive reconstruction of 'R' I suggested in section 1.1, a reference point was construed as a moment of time at which it would be appropriate to utter a past-tense counterpart of a sentence originally marked for the past or future perfect (anterior past or anterior future). About all I have done so far that might help in clarifying this is to provide a tenseless ' σ ' with which to construct a counterpart. It's the notion of "appropriateness of utterance of a sentence" which does all the interesting work, and it is very obscure. Yet it is not the obscurity which is immediately bothersome, but the fact that "it would be appropriate to utter ' σ '" fixes no moments by means of events or event-expressions. There is normally no event to do this, nor is there a "realized" sentence. And in fact it is irrelevant to the analysis of a "reference point" if there does happen to be some utterance available (in this case, some actual past-tense utterance like 'Mort dropped the potato', uttered at R by someone).

There are of course many things we could now do, limited only by ingenuity and a reasonable respect for intuitions about how tenses work. Perhaps 'R' could be defined over "possible" utterances of appropriate (true?) sentences; possible worlds are available, and propositions and all the other machinery of the semantics of possibilia. I do not want to offer a detailed analysis here. I am more interested in emphasizing that, if my account of tenses is approximately correct so far, we do need to define something like 'R', and we have to do it with fairly powerful machinery. The point is obvious. Ordinary English tense constructions do more (semantically) than "express" the relationship between the time of an utterance and the time of an event. To say what more they do involves ways of talking about possible utterances, and appropriateness conditions for them.

Once we have possible utterances, the last step is clear. It is a variation of a move tense logicians have used for several years: talking about the truth of a sentence at a time. But where tense logic

uses 'true' (or 'realized'), I'll substitute 'appropriate'. And I also make more radical changes. The basic insight of the SER account is that each tense, even the simple present, is on analysis the product of two "relations". The first relation is that between E and R, and the second between R and S. The (ER) relationship yields Reichenbach's 'posterior', 'simple', and 'anterior', and it may be restated: 'the time at which ' σ_t ' be true {precedes
is simultaneous with
succeeds}

the time at which ' σ'_t ' be appropriate', where ' σ'_t ' is an appropriately "tensed" counterpart of ' σ_t '. Candidates for ' σ'_t ' are, where ' σ_t ' is 'George miss the boat at t' (Miss g,b,(t)): 'George {missed
is missing
will miss}

the boat at t'. The raised-eyebrow quotes are around 'tensed' above because the (possible) utterance ' σ_t ' does not fulfill the conditions for a fully-tensed sentence; the relationship between R and S is not specified. The (RS) relationship, like (ER), is either 'precedes', 'simultaneous with', or 'succeeds', hence, 'the time at which ' σ_t ' be appropriate {precedes
is simultaneous with
succeeds} the time of speech'. This

relationship yields Reichenbach's 'past', 'present', and 'future'. The restatements of (ER) and (RS) are conjoined by 'and'; tenses are in part claims to the joint truth of instances of these schemata. There is of course an ordering involved, for the second clause has an expression (' σ'_t ') which is "generated" by the first. Another way to think of the two clauses is as providing the ratio for two operators, the first of which "operates" on a tenseless sentence, and the second on the result of the first operation.

I'll provide an example of how this very sketchy version of an SER semantics works. Take the embedded clause in 'George didn't expect that you would be at the convention tomorrow', that is, 'you would be at the convention tomorrow'. ' σ_t ' is 'you be at convention at t', where t=tomorrow from the point of view of speech time. So, substituting, 'the time (t) at which 'you be at convention at t' be true succeeds the time (t') at which 'you will be at the convention at t' be appropriate and the time (t'') at which 'you will be at the convention at t' be appropriate precedes the time (t'') of speech'. In symbols, this becomes, ' $R_{t''}/E_t$ and $R_{t'}/S_{t''}$ '. The temporal ordering of t, t', and t'' yields R/S/E for this clause, an instance of the posterior past.

This semantics is unfortunately clumsy, so I'll offer a plausible translation. The example I just discussed, in the anterior past, becomes 'Appropriate then: you will be at convention at t'. In general, the simple tenses become: 'Appropriate {then } 'you are at convention at t''.
{now
after now}

The anterior past, to take another example, is, 'Appropriate then: 'you were at convention at t''. This translation technique offers a more perspicuous representation of what tenses are. Tenses are (in part) claims to the appropriateness of temporally-specified sentences.

It is important to notice that, although my translation of the anterior past, 'Appropriate then: 'you were at convention at t'' appears to resemble ''You were at the convention' was true', and similarly the simple past 'Appropriate then: 'S is \emptyset at t'' looks like ''S is \emptyset was true'', these translations are not the standard tense-logic renditions of these tenses. The chief reasons are obvious. The embedded ' σ_t ' is not fully tensed in my theory. And every tense (even the simple present) is represented as a product of an (ER) [' σ_t '] relationship and a (SR) ['appropriate {then } now } after now'] relationship. To put it a

different way, each tense is represented as the result of two operations on a detensed sentence. The first "partially tenses" the sentence, while the second "fully tenses" it. The simple present, 'Appropriate now: 'S is \emptyset at t'' is not, then, just an (ES) relationship.

2.2 In this reconstruction of an SER theory of tenses, R plays an important role, and the notion of appropriateness is essential. One apparently reasonable condition of appropriateness is that, if S and R coincide, referring expressions in subject position in ' σ_t ' are presupposed by the speaker to refer. This captures many of the facts I discussed with the S,R tenses. It is one aspect of "current relevance". It does not, however, handle 'George believes that Santa Claus is crawling around on the roof', for the speaker need not presuppose that 'Santa Claus' refers. With many indirect discourse constructions, belief-contexts and the like, the speaker does not need to presuppose anything about the reference of terms. But this presupposition does work with non-embedded sentences, and of course it works in the complements of factive verbs, if the speaker believes the complement to obtain at S. 'Believe' insulates contexts which follow it, making them opaque. But it has bothered many contemporary philosophers and -- to a certain extent -- linguists, that 'believe' does not create completely opaque contexts. With regard to problems of tense, if current relevance or another factor is strong enough, 'George believed that Dick is a crook' is fine. I have already argued that this is reasonable, and can be "explained" by a shift of reference point in the embedded clause. A little more exploration of this phenomenon with present-tense matrix and present-tense embedded verbs will give a brief indication of how the speech-act version of the SER theory might look.

It is reasonable to assert that -- story-telling contexts and the like apart -- most utterances reflect the speaker's "point of view". This is particularly clear in S,R-tensed sentences, except for puzzling

cases like 'believe'. A present-tense matrix 'believe' can be read to reflect the speaker's "present point of view"; but what about the complement, where it is in the present tense? I suspect that there is no reason not to treat 'believe' as a (leaky) "world-creating" verb,⁶ where the R of the embedded sentence is taken to be that of the person whose beliefs are being described. The embedded sentence can then be treated as a paraphrase on the part of the speaker of a (possible) utterance of the person whose beliefs are being described. But if this embedded sentence is treated as a paraphrase,⁷ the "present point of view" expressed in the embedded clause need not (though it may) be taken solely as the point of view of the person whose beliefs are being described. The embedded sentence may, under certain circumstances, permit the R of the speaker to leak in.

Different kinds of matrix verbs determine different kinds of semantic conditions, but most are relatively predictable under sequence-of-tense rules. Propositional attitude verbs cause the greatest problems, but they can be treated as world-creating verbs that are leaky; propositional attitude verbs sometimes permit the speaker's R to leak through.

In any case, though it is difficult to draw up general "conditions of appropriateness", the idea to capture with R is, roughly, "what the speaker would say at R". Tenses are devices which speakers can use to shift their positions, and it is not surprising that speakers usually carry their beliefs along with them.

3.0 How might the SER theory fit into a formal grammar? It has one great advantage, for it treats sentences as tenseless before they crank through the "tensing" machinery. This machinery is semantic, or rather semantic-pragmatic and, if one feels that a semantic "component" should be divided from a syntactic, it is handy to be able to solve separate problems separately. But on the other hand, the SER theory is consistent with a theory which begins with "logical structures". Logical structures can, of course, be tenseless.

FOOTNOTES

1. A percentage of speakers read 'Mort had dropped the potato' as a simple past, if there is no specified reference point. I don't share this dialect; I get the sentence as a past perfect even without an independent specification of reference point, by (I suspect) supplying an indefinite one. But something does feel wrong here. Cf. below, section 1.6.
2. Several non-factives do not permit shifting here, e.g., 'maintain'.
3. Cf. on this point Huddleston's article, 'Some observations on tense and deixis in English', p. 778 et. al.

4. Robert Fiengo, in a paper presented at the 1972 NELS meeting, defends the view that the difference between active and stative verbs consists in the kinds of quantifiers used over the arguments of these verbs.
5. Sentences like 'George killed the duckling' in conversation-initial positions can, of course, do special jobs. Much as 'It's cold in here' could be uttered in a context where the speaker wishes the hearer to close the window, 'George killed the duckling', where the speaker can assume that there is a shared context, might be used to say, e.g., 'Duck for dinner'.
6. Jerry Morgan develops a theory of presuppositions sensitive to "world-creating" verbs in a paper in CLS 5. The term was originally George Lakoff's, used in a paper, 'Counterparts, or the problem of reference in transformational grammar', printed in one of the Harvard Comp. Lab reports -- I can't remember which, and I can't find it. Try after 1968.
7. 'Paraphrase' is a term much-used by Quinians to take the place of 'translation'. It has several advantages; cf. Word and Object, pp. 218-219.

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